

## Water and Sediment Quality Data Management

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### **Our Unique Situation:**

The Corps Districts and Division office in the Pacific Northwest are in a unique environmental, political, social and legal circumstances in that strongly influence on how we approach data and our overall management. This unique situation is best described by the following nine factors:

- a. Size of Watershed: The Pacific Region addresses water management issues for the Columbia River Basin watershed, which is the largest in the nation. Beginning in British Columbia, the Columbia River flows 1200 miles through 260,000 square miles. If the watershed were on the East Coast, it would encompass an area larger than the 12 states from Virginia and West Virginia northward to and including Maine. This watershed covers part or all of three states in our Division and three Districts. The size of our watershed demands that we approach some of our work with a regional perspective. This one factor has had the most profound impact on how the NW Division addresses work in the Pacific Northwest.
- b. Clean Water Act The Clean Water Act requires addressing impaired waters of Pacific Northwest, such as the Columbia River with elevated TDG levels, which is generated as a result of spill for fish passage as required by the 2000 NMFS Biological Opinion. The Snake River is considered impaired for elevated temperature. As a result EPA, the States, the Tribes and the Action Agencies have completed the environmental regulating tool that establishes the Total Maximum Daily Load (TMDLs) for a pollutant. Since TMDLs are addressed on a watershed approach, we are required to approach our TMDLs with a regional perspective since our watershed is so large. The state of Oregon is beginning to address toxics TMDLs and they are especially interested in mercury levels in water and sediments. As a result, having water and sediment data will be very important in addressing these issues.
- c. Endangered Species Act: The Endangered Species Act provides protection of endangered or threatened species. For the Pacific Northwest, this includes various species of salmon; bull trout; and white sturgeon that exist in the Columbia River Basin. As a result the National Oceanic and Atmospheric Agency (NOAA) Fisheries' issued a Biological Opinion (BiOp) which has many requirements for the Action Agencies to perform. There are several requirements that specifically deals with data and data management

- d. Biological Opinion RPA 198: The 2000 Biological Opinion includes Reasonable and Prudent Action 198, which says, “The Action Agencies shall have a common regional database for fish, fish habitat and water quality.” The Action Agencies are the Corps, Bonneville Power Administration (BPA) and the Bureau of Reclamation, with BPA as the lead agency for RPA 198.
- e. Environmental Groups: There are strong Environmental Groups organized to protect the environment and endangered species. They believe in and promote the removal of Corps dams. As a result, the Corps has additional work to show the environmental impact of the dams on the fish survival, identify and take steps to improve fish survival.
- f. Regional Environmental Attitude: The Pacific Northwest society is generally supportive of the environmental groups
- g. Court Cases: In 1999 the National Wildlife Federation sued the Corps for not meeting water quality standards for TDG and temperature on the Snake River. As the court case proceeded, the plaintiffs realized they were not likely to prevail on their allegations concerning TDG as the Corps was obtaining variances from the states of Washington and Oregon and the DGAS study provided a substantial amount of information on alternatives that would reduce TDG production and be fish friendly. The plaintiffs focused their efforts on allegations that the Corps was violating the temperature water quality standards. This year (2003) the court determined that the Corps decisions to implement the NMFS 2000 BiOp, as reflected in the Record of Decision (ROCASOD), adequately took into account the Corps legal obligations under the CWA. Once the temperature TMDLs are issued, this issue of exceeding temperature water quality standards could be revived.
- h. Precedence Setting: Frequently, Northwestern Division actions establish precedence within the Corps, so we recognize that we must think issues through thoroughly, taking into consideration its potential impact on other Corps Divisions.
- i. Establishing Corps Policy: Some of this region’s past work has become the basis for establishing Corps policy. In the Corps temperature studies we collected temperature data that was used to establish temperature TMDLs on the Snake River.

### **Our Data Needs:**

With the Pacific Northwest region’s unique environmental, political, social and legal situation comes certain data needs that may be common to all the Corps, which includes the following:

- a. Technically Sound Data: We need high quality data that can be used to establish technically sound basis for actions and decisions, especially those decisions associated with CWA and ESA issues.
- b. Legally Defendable Data: We need high quality data that can be used to establish legally defensible basis for Corps program decisions and actions such as TMDLs; RPA 132 (review of TDG monitoring program), and 143 (a plan to model temperature on the Snake River.)

- c. Adequate Amounts of Well Managed Data: We need an adequate amount of well-managed high quality data that can be used to establish the effectiveness of our work.
- d. Credible Data: We need high quality data that can be used to support the corporate positions on TMDLs development and implementation.

After considering our environmental data needs, we developed a regional vision and goals which takes in the legal, technical, and political needs of the Corps in this region.

### **Our Vision and Goals:**

There are two ultimate goals for the NW Region data management:

1. Establish a Public Query System: Establish a public query system like the Chesapeake Bay Website (see [www.chesapeakebay.net](http://www.chesapeakebay.net)) where all of the different federal and state agencies, tribes and other regional entities' data for the region is available at one Internet location. The equivalent for our region is called the Columbia Basin Cooperative Information System (CBCIS). BPA is the lead agency for this endeavor and is working with Science Applications International Corporation (SAIC) the same contractor that established the Chesapeake Bay Website. To establish a public query system like Chesapeake Bay Website is the long-term requirement for BiOp RPA 198.
2. Establish a consolidated database: Establish a consolidated database for the Columbia River watershed that has Corps water quantity and water and sediment quality data together so we can easily and quickly obtain any data to show the Corps responsibility and actions taken to meet the Clean Water Act and Endangered Species Act. This consolidated database would be the Corps contribution to the Columbia Basin Cooperative Information System.

### Chesapeake Bay Program:

Since one of our ultimate goals is to establish a public query system like the Chesapeake Bay Program, which is considered a national and international model for estuarine research and restoration programs, I would like to provide a brief overview of that program as it relates to data management.

CBP Purpose: The Chesapeake Bay Program is a unique regional partnership that has led and directed the restoration of the Chesapeake Bay since 1983. Improvements include fisheries and habitat restoration, recovery of Bay grasses, nutrient and toxic reductions, and significant advances in estuarine science.

CBP Partners: The Chesapeake Bay Program has 13 different regional entities as partners including the states of Maryland, Pennsylvania and Virginia; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the Environmental Protection Agency, representing the federal government; and participating citizen advisory.

CBP Data Management: There are 32 different databases in the data warehouse system. A data warehouse system is where collections of integrated institutional data

can be accessed for the purpose of performing analysis, producing ad hoc queries and reports. The list of databases in the CBP is shown in Figure 1.

#### Columbia Basin Cooperative Information System

By contrast the Columbia Basin Cooperative Information System is much more complex and in its infancy. The CBCIS was first envisioned as part of the 2000 BiOp. Here is a brief overview of the program as it currently stands:

CBCIS Purpose: CBCIS is to be the single comprehensive system that can be used to evaluate factors affecting listed salmonids, actions taken, the feasibility of future actions, and continual confirmation that these measures are sufficient to avoid jeopardy and facilitate recovery of listed salmonids.

CBCIS Partners: By comparison, the CBCIS has approximately 3 times more partners. The Chesapeake Bay Program has 13 partners and to date, the CBIS has over 42 regional entities.

CBCIS Data Management: By comparison, the CBCIS has approximately 8 times more databases to integrate into a data warehouse system than the Chesapeake Bay Program. SAIC is gathering information on exactly how many and what kinds of databases there are in our region and to date, there are over 241 databases.

As the lead agency, BPA is working to develop the overarching data warehouse structure. The Corps water quality database will be consistent with BPA's effort to integrate water resource and fisheries resource information for the Columbia River Basin as part of RPA 198 of the 2000 NMFS Biological Opinion.

In order for the Corps to achieve these two goals, our Region needs to:

- a. **Bring data together:** Bring our water quality and water quantity real time data together with the discrete grab data so all water quality data for the entire watershed is available from a single database. The discrete data would include the water and sediment quality data.
- b. **Approach data management from a Regional perspective:** Collect and manage data with a watershed approach so that it can be used in as many ways as possible. This will be especially important in our region where water quality data are used in the CWA and ESA issues. This means the three districts in the Columbia River Basin would manage water quality data using the same approach, with the same database.
- c. **Use standardized Approach:** Use the same consist and standardization approach to data management so the end user can more easily compare and analyze the data. It would be best if the naming nomenclature for the project currently used in CWMS/ CROHMS were also used in the water quality data management approach.

#### **Why We Want to Pursue this Vision:**

For the Corps, the Pacific Northwest region has historically taken a unique approach toward data management. Because of the large size of our Columbia River Basin watershed, we have approached data from a regional perspective. For those who may

not be aware, this region's water quantity data that we use to regulate the Columbia and Snake River projects in the Columbia River Basin is centralized and managed at the NW Division office since the 1960's. Water quantity data from three Corps Districts, Public Utilities Districts and other federal agencies are transmitted hourly to our CROHMS water quantity database called CROHMS, which stands for Columbia River Operational Hydromet and Management System. CROHMS is recognized as the first and largest regional water quantity database in the world. Over 170,000 pieces of data are entered daily.

With the evolution of environmental laws, the Pacific Northwest region has once again taken a unique approach toward data management. Our unique environmental data needs stems from the impacts that the Clean Water Act (CWA) and the Endangered Species Act (ESA) have on our project operations and this region. In order to understand why we took the extensive steps that we did with data management, it is helpful that I share our unique situation.

### **How We Would Use a Consolidated Database Approach:**

There are many ways that we would use a regional watershed data management system as described in our vision. They are:

1. Performance Measures: The 2000 Biological Opinion requires the Action Agencies to identify and meet performance standards such as increased juvenile fish survival in the estuary and tributaries. The water and sediment quality data will be used to provide evidence for the Corps performance measures to meet these BiOp requirements.
2. Supporting Data for Establishing Toxic TMDLs: Toxic TMDLs are the next focus for state water quality programs and having excellent data that is readily accessible would be very helpful in assisting to establish TMDLs levels that are acceptable to the Corps.
3. Establish Public Query System: The 2000 Biological Opinion requires the Action Agencies to establish a database for fish, fish habitat and water quality. The Corps would use a consolidated water and sediment database as our part of this larger system. The Corps will use the water quality database to provide technical information to the public showing the facts related to the Corps responsibility to meet the Clean Water Act, Endangered Species Act and the Data Quality Act.
4. Defend The Corps in Legal Actions and Court Cases: When various entities sue the Corps as they already have, we will have high quality, well managed data that we can use confidently to defend ourselves.
5. Provide Data for Studies and Research: A consolidated database with water and sediment data as part of a public query system would provide data that could be used in studies and research on not only water quality issues, but also on fish, fish habitat and fish issues. This already occurs with the real time water quality data that is public accessible. The Washington State University established a public query system that has water quantity, water quality; and fish count databases linked to a public

query system called DART. Since it is publicly accessible, there are others who choose to use the data for research and studies.

#### **Where Are We At In The Process:**

There are several actions occurring in attempt to arrive at our overall vision. We have reviewed many databases, made a recommendation to our Water Management Board, which consists of Hydraulics and Hydrology Chiefs and Operations Chiefs from the three districts in the Columbia Basin and from several representatives from the Division office. Currently, the Water Management Board is in the process of discussing and evaluating the database recommendation and the various database options.

The Water Management Board is reviewing regional O&M budgets in FY2005 and beyond. As a region we must recognize the future impacts of the Corps' responsibility under the existing Biological Opinions and the Clean Water Act. The BiOp process includes annual performance reviews and findings letter from NOAA Fisheries. As the water quality appendix of the Biological Opinion (Appendix B) and RPA 198 discussed above are due for implementation, the Corps must move corporately to respond to these needs. Our vision includes responding to these future needs and strategically plan to be ahead of the curve when needs arise.

There will be a cost to implement this prospect, but we are encouraging the Water Management Board to work together to develop a reasonably priced alternative that will meet our long-term regional needs. The Regional Management Board consists of the Directors of Civil Works; Military and Technical and Resource Management with two representatives from each district, which includes the Deputy Project Managers, and one other person. The Regional Management Board function is to encourage a consistent and prudent regional approach to the Corps major activities while making the best use of limited funding. The Regional Management Board will make the final recommendation and decision on water quality database.

The existent of a Regional Management Board with a regional focus is helpful with our vision of approaching data management from a regional watershed approach. We recognize that some of our approaches may be different from other divisions of the Corps, but we are sharing with you what we are doing and some of the aspects of our region that propel this project forward. We also are sharing with you what assists us in accomplishing our regional approaches that may be more difficult to accomplish in other divisions.

#### **In The Interim**

As we continue to make progress toward achieving our vision of managing water quality data in a regional watershed approach, we encourage everyone to continue to work together. It is important that we work with Headquarters as we develop this strategy and move out on leading edge technology for the Corps as we prepare a regional, watershed approach that will provide for future needs.

## **FIGURE 1**

### **Databases Used in The Chesapeake Bay Program:**

#### **Water Quality:**

1. CBP Water Quality Database (1984-present)
2. CBI Water Quality Database (1949-1982)
3. CBP Toxics Database
4. Alliance Citizen Monitoring Database Exit CBP (More info)
5. USGS River Input Monitoring Database Exit CBP (More info)
6. USGS Monthly Stream Flow Data Exit CBP (More info)
7. USGS Potomac NAWQA Datasets Exit CBP (More info)
8. SRBC Nutrient Assessment Program Exit CBP (More info)
9. National Estuarine Research Reserve System (NERRS) Exit CBP (More info)

#### **Living Resources:**

1. Baywide Benthic Database
2. Baywide CBP Plankton Database
3. Baywide Fluorescence Database
4. Virginia Trawl Survey Database Exit CBP (More info)
5. Virginia Beach Seine Survey Database Exit CBP (More info)
6. Baywide CBP Aerial SAV Survey Exit CBP (More info)
7. Maryland Biological Stream Survey Exit CBP (More info)
8. NOAA Fishery-Independent Surveys in Chesapeake Bay Exit CBP
9. NOAA Fisheries Statistics and Economics Database Exit CBP (More info)

#### **Point Source:**

1. CBP Nutrient Point Source Database

#### **Modeling:**

1. CBP Watershed Model Scenario Output Database, Phase 4.3

#### **Cross-cutting:**

1. CBP GIS Datasets
2. CBP Historical Data Sets
3. Environmental Monitoring and Assessment Program (EMAP) Data Exit CBP
4. Multi-Resolution Land Characteristics (MRLC) Land Cover Exit CBP
5. USGS Chesapeake Bay Region Data Exit CBP (More info)
6. Chesapeake Bay Chlorophyll Remote Sensing Project Exit CBP (More info)
7. Chesapeake Bay Land Margin Ecosystem Research-Trophic Interaction in Estuary Systems Exit CBP (More info)
8. National Wetlands Inventory Data Exit CBP (More info)
9. NASA LANDSAT Imagery Exit CBP (More info)
10. Atmospheric Deposition Measurement and Analysis Information Resource Exit CBP
11. USGS Impacts of Climatic Variability on Chesapeake Bay Exit CBP
12. Eyes on the Bay Exit CBP (More info)